DOD Executive Agency for LLRW

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the RAD WASTE NEWS

DEPLETED URANIUM AND U-235 AN ANSWER TO A CONFUSING SITUATION By Derek Cornette

We have had several calls about when a DOE 741 form is required with regards to the trace amounts of U-235in depleted uranium (DU). If you ship enough DU in one package, you can have over a gram of U-235 in the package. Do you need to account for that one gram? If you read the instructions for filling out the 741's you may think that you do, but it is not required since it is not enriched uranium and the DU that the DOD has is not imported. Also, reporting the movement or transfer of DU (source material) is required per 10 CFR, but non-nuclear end use items or devices are exempt from this reporting. This includes munitions, shielding, armor, etc. The Nuclear Regulatory Commission (NRC) sent us this clarification, so all involved would have the answer from the source. Thanks, NRC.

Another question came up that involved DU. If I have enough DU, can I exceed the fifteen-gram fissile exception in 49 CFR? If this happens, do I have a fissile shipment? The correct answer is "NO". Per the definition of fissile material in 10 CFR 71, DU is not considered fissile material no matter how much U-235 is contained in it.

I hope this clarifies any misconceptions about DU and 741 forms. If you have any questions call me at COM: 309-782-1736, DSN: 793-1736. If you need information on filling out Form 741 look at NUREG BR0006 on the web at http://www.nrc.gov/NRC/NUREGS/BR0006/R4/br0006r4.html.

Inside this issue:

Special points of interest:

- FIND OUT THE LATEST ON THE RAPIDLY CHANGING WORLD OF LLRW DISPOSAL!! - CHECK OUT THE LINK TO THE ANNUAL MEETING WEB SITE AT: http://www.ioc.army.mil/dm/DMWWEB/indexdmw.htm

DODRAD 2001

Things continue to change rapidly on the low-level radioactive waste front - Envirocare is finalizing its B and C License, Texas Legislature will be meeting and potentially decide the fate of low-level radioactive waste in Texas, the Environmental Impact Statement is running into challenges for the Hanford disposal site, and critical issues of sovereign immunity and

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From the Desk of the Chief

A year ago I predicted an exciting year for the DOD Low-Level Radioactive Waste Disposal program. My predictions pretty well hit the mark –

*Exportation fees for the Southwest and Rocky Mountain Compacts. At the beginning of the year, we did not know if we could legally pay these fees. Our lawyers helped us with legal solutions to obtain compact permits and thus dispose of waste from those two compacts.

* South Carolina joining with Connecticut and New Jersey to form the Atlantic Compact. South Carolina did form the Atlantic Compact with Connecticut and New Jersey. They developed a progressively restrictive schedule for out of compact waste. So far, the DOD does not see any significant impact from this restrictive schedule because alternatives exist. These alternatives, if they require additional processing, may be more expensive.

* Proposed rulemaking. Although several proposed rules are under consideration, no major rule changes occurred which affect disposal of low-level radioactive waste. We have commented on several proposed rules but no rulemaking has significantly affected the DOD LLRW disposal program.

* The 10th Annual Waste Generators Meeting. We had a very successful generator meeting in Williamsburg, VA this year. We are in the midst of planning the 11th Annual Waste Generators Meeting that will be held in St. Louis, MO. We continue to look forward to meeting our customers and our service providers at this meeting.

* Ambitious disposal project schedule. In FY 2000, we executed a $20.2M program. We disposed of 24,106 ft3 of radioactive waste. We also recycled 42,116 curies of material. We disposed of waste from Panama, Europe, Korea, Puerto Rico, and from most of the United States. We thank our customers and service providers for helping make this a very successful year for the DOD program.

* Implement AR 700-48, Management of Equipment Contaminated with Depleted Uranium or Radioactive Commodities and DA Pam 700-48, Handling Procedures for Equipment Contaminated with Depleted Uranium or Radioactive Commodities. We are mush closer to a fully mission capable Army Contaminated Equipment Retrograde Team (ACERT). During the past year, we signed a Memorandum of Agreement with the St. Louis Corps of Engineers to help staff the mobilization ACERT Table of Distribution and Allowances (TDA). We also began facilitizing an ACERT training facility. This facility will allow hands-on training on Army commodities that contain radioactive material.

* Implementation of Joint Computer Aided Acquisition Support (JCALS) System. JCALS is a software program that automates workflow. The JCALS pilot was not as successful as we would have liked. While we were energetic and looking forward to automating our process, our information technology support was not as supportive. It is a cumbersome system and now we are looking at next generation software. In the meantime, we have almost developed a web inventory form for users who wish to send their disposal requests through the web to us. We will also be beta testing a new version of the Waste Management Information System (WMIS). It will help automate the information from waste manifests for easier retrieval and manipulation of data.

* Army excess radioactive commodity consolidation facility. This concept morphed into the ACERT training facility. Our office had a material weakness because our ACERT teams are not operationally ready for their wartime mission. As you can see in the implement AR 700-48 bullet above, we are moving out to ensure that we have a mission capable team. We will get some of the "training aids" for the facility from Army units who have excessed their radioactive commodities.

So, all in all, the year 2000 was a challenging and rewarding year for the DOD LLRW and Army program. I can hardly wait for the new challenges and opportunities in 2001.

Rosalene Graham

Significance of Radioactive Decay Chains by Michael Gray

Knowledge of the radioactive decay processes concerning nuclides which produce progeny that are also radioactive, can be crucial to making scientifically sound decisions regarding the impact of radioactive material on the life cycle management of commodities, remediation processes at cleanup sites, licensing conditions, and the disposal of radioactive waste. Correct judgmental decisions regarding these issues can often be significantly enhanced, if one understands the impact a radioactive decay chain can have on inferences made from laboratory data.

Radioactive decay is a process in nature by which various forms of matter (e.g. nuclides) transform to a lower energy state. During this process, nuclides may be created that are unstable and in turn decay and create more unstable progeny (daughters). The sequential progression of radioactive progeny continues until a stable nuclide is produced. The sequential list showing all possible progeny beginning with the parent nuclide and ending with a stable nuclide is a radioactive decay chain.

Common examples of radioactive decay chains are the thorium series, the neptunium series, the uranium series, and the actinium series. For the thorium series alone, a total of 10 different daughters are sequentially produced that form a chain of daughters that ends with the stable radionuclide Pb208. The buildup of radioactive progeny is often referred to as daughter ingrowth. (For more information on these decay chains, look in The Health Physics and Radiological Health Handbook.)

So how can knowledge of decay chains be useful to you?

How about interpreting data from radioactive surveys, remediation processes, or contaminated equipment? If laboratory data indicate the presence of a short-lived radionuclide that is in a decay chain, then other radionuclides in the decay chain are likely also present.

Here are a couple of examples of how your judgment might be influenced by the fact that the radionuclides of concern are a member of the uranium series (U238) decay chain:

(1) Gamma spectroscopy measurements establish the presence of Pb210 during a radiological survey. A quick check reveals that Pb210 is a member of the U238 decay chain. Moving up the decay chain from Pb210 reveals radionuclides that are short-lived until Rn222 (half-life of days) and Ra226 (half-life more than a millennium). This would make Ra226 one of the primary suspects for the source of the Pb210 contamination.

(2) Analysis of wipes for gross alpha/beta revealed that significant removable contamination levels were measured immediately after the wipes were collected, but the same wipes measured 24 hours later were at or near background radiation levels. A review of the U238 decay chain reveals that daughters after Ra226 are short-lived until Pb210 is reached. You could conclude that the Ra226 contamination was not removable and justify implementation of a change of protocol policy that future counts of wipes should be conducted at least 24 hours after the wipes were taken in order to allow the short-lived radionuclides time to decay.

Using the knowledge of radioactive decay chains can help produce a much more accurate assessment of important information such as the true activity of the material present, help determine the presence of parent or daughter radionuclides that were not initially detected and develop procedures to obtain correct accurate laboratory measurements. Taking the time to check whether or not a radionuclide is part of a decay chain will at the very least enhance your ability to make scientifically sound judgments on issues concerning radionuclides.

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control of the import and export of federal waste by states and compacts once resolved may impact the way we do business significantly.

NEW—MORE AGENDA TOPICS DESIGNED FOR RADIATION SAFETY AND PROTECTION OFFICERS !
This years agenda will have all the informative topics of past meetings including the up-to-the-minute news from the disposal sites and compacts, but will also have a new concentration on practical information and workshops including: how to select a consolidation area, and preparing excess radioactive material for shipment. More information that you the generator can use!

NEW—ON-LINE REGISTRATION !
This year we have a new on-line registration web site. This simple method of registration allows you to register for the meeting and also indicate your interest in the special activities that we have scheduled. This web site will allow you to access information on submitting abstracts for technical presentations, exhibiting at DODRAD 2001 and provide you access to last year's attendee list and agenda, all from your computer. AND, this year we offer you the opportunity to register for your hotel room on-line with a link to a hotel registration page and a group code that will guarantee the easiest, most convenient registration experience ever, with automatic registration confirmation via email.

This year's location is the St. Louis Marriott Pavilion Downtown. Direct flights are available to St. Louis from all major cities, and the hotel is accessible by Metrolink from the airport.

NEW—MORE ACTIVITIES TO CHOOSE FROM
Every year attendees are asking for a golf outing and this year for the first time we are meeting at a time of year that will give us the adequate light in off-duty hours needed. Also we are offering a tour which will visit two interesting sites in the St. Louis area, the St. Louis Airport FUSRAPS sites and the DOE Weldon Springs site. When you register on-line you will be able to indicate your interest in these events and should we have an adequate level of interest, they will be available.

REGISTER NOW!!! AT....
http://www.ioc.army.mil/dm/DMWWEB/ann2001.htm
Please contact Mr. Rich Conley, conleyr@osc.army.mil , or (309) 782-0171,. DSN 793-0171. We still are looking for your suggestions on agenda topics!

Special Nuclear Material Disposal by Judy Woodson

A formal definition of special nuclear material (SNM) is plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Nuclear Regulatory Commission, pursuant to the provisions of section 51 of the act, determines to be special nuclear material.

We can dispose of this type of material at various sites. But sometimes, especially for discrete sources, its not a simple process. For example, to dispose of SNM at the Barnwell burial site we request a variance for disposal through Chem-Nuclear Systems, LLC (contractor who runs the state-owned site). The variance contains the name of the installation, waste description, radionuclide and activity. They will submit our request to the Department of Health and Environmental Controls (DHEC) for approval. If the variance is approved, CNS will provide a letter of acceptance and the actual approval letter they received from DHEC. A copy of the DHEC approval letter, the CNS acceptance letter and our request letter must accompany the shipment manifest.

We may not be able to commercially dispose of large activity sources due to the disposal facility's license acceptance criteria. But there are other options such as the Department of Energy's Waste Isolation Pilot Plant, for greater than Class C transuranic materilas. So, if you have unwanted special nuclear material notify us as you would any other unwanted radioactive material.

POC is Ms. Judy Woodson, DSN 793-1886, or commercial 309 782-1886, electronic mail woodsonJ@osc.army.mil.

ISSUE OF THE DAY – SAND BLAST GRIT by Kelly Crooks

Its funny, but for whatever reason we periodically see problems pop up in bunches even when they may have never been a problem before. The latest example of this is sand blast grit. We got calls from three different installations within two weeks of each other all with essentially the same dilemma. Their grit, that was supposedly non-radioactive, was tripping a portal monitor at either the Defense Reutilization and Marketing Office or the disposal landfill. This can be tricky, as the grit may be hazardous waste depending on its contaminates after use.

The why of this is two-fold: first, the sand contains trace levels of naturally occurring thorium, in fact it may come with a Material Safety Data Sheet (MSDS) stating it contains up to, say, 10 pCi/g thorium; second, the sensitivity of monitors has gotten to the point where they can detect very low levels of radioactivity down to the single digits of pCi/g.

Does this mean the material is radioactive waste or mixed waste and should be disposed of as such? Not necessarily. Material containing less than 0.05% by weight of source material, in this case thorium, is exempt from Nuclear Regulatory Commission (NRC) control. Therefore, assuming an MSDS or sampling has found you are below this limit, you have cleared the federal regulatory question of whether you have to consider the material as radioactive waste. Nevertheless, there are others to consider on where you can dispose of the material.

Next, look at your preferred disposal site and consider its location. The state may follow the NRC criteria or may be more restrictive on the unregulated thorium concentrations. Then, the disposal site may have its own acceptance criteria that may follow the state level or could be even more restrictive.

Assuming you have met all that criteria are you ready to ship? NO! All through this process, you better be coordinating with the disposal site and the host state regulators. You still have the potential of tripping a monitor and the receiver must be ready for that. In addition, some states are particularly sensitive to disposal of any radioactive material no matter how low the levels so they need to know exactly what they are getting ahead of time.

OK, so what to do now that I have scared you into paralysis? First, if you are using grit with thorium consider alternate non-rad grit for future buys. There may be no extra cost but even if there is, it is worth it. If you have this type of material and it may trip or has tripped a monitor call us to help determine the options of what to do with it.

POC is Mr. Kelly Crooks, DSN 793-0338, com (309) 782-0338, e-mail crooksk@osc.army.mil.

Availability of Revision One to MARSSIM and Updated D and D and ResRad Computer Models by Dave Horton

Mike Styvaert covered release limits in "*So What is the Release Limit?*" in the September 2000 issue of *the Rad Waste News.*

As a follow-up to that discussion, we often apply these limits in decommissioning a site using the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575. We have discussed MARSSIM in previous articles. It is a multi-agency consensus document developed by the Department of Defense, Department of Energy, Environmental Protection Agency and the Nuclear Regulatory Commission. As stated in the Abstract at the beginning of MARSSIM *"The MARSSIM provides information on planning, conducting, evaluating and documenting building surface and surface soil final status surveys for demonstrating compliance with dose or risk-based regulations or standards."* The agencies published the final version of MARSSIM in December 1997.

The 18 October 2000 Federal Register announced the availability of revision one. You can download the revision from the Environmental Protection Agency website at http://

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SAND AT SAVANNA

by Mike Styvaert

The OSC Safety/Rad Waste office recently completed a remediation/quasi-decommissioning project at the Savanna Army Depot Activity in Savanna, IL. In 1996, the Army added Savanna to the base realignment and closure (BRAC) list under Public Laws 100-526 and 101-510. Aguirre Engineers, Inc., (AEI) conducted radiological release surveys for 83 buildings and 4 outdoor areas under an Army contract in the fall of 1998. The Aguirre final report identified an outdoor area with elevated gamma exposure rates. The site in question once contained a storage silo that housed a strategic stockpile of ***monazite sand***.

Monazite Sand is defined (Columbia Encyclopedia: Sixth Edition 2000) as *"a yellow to reddish-brown natural phosphate of the rare earths, mainly the cerium and lanthanum metals, usually with some thorium. Yttrium, calcium, iron, and silica are frequently present. Monazite sand is the crude natural material and is usually purified from other minerals before entering commerce. Monazite occurs in North Carolina, South Carolina, Idaho, Colorado, Montana, and Florida in the United States, and in Brazil, India, Australia, and South Africa. It is an important source of cerium, thorium and other rare-earth metals and compounds."*

The Savanna Monazite Sand was a strategic stockpile owned and managed by the Defense Logistics Agency (DLA). Strategic uses for the high-thorium material include the manufacture of lantern mantles, as a component to lightweight alloy aircraft components, as a coating for optical components and as a potential indirect source of breeder reactor fuel. Savanna stored 219,113 pounds of monazite sand containing 5.5% ThO2. DLA sold the material in 1974 to Englehard Minerals & Chemical Company. Englehard brokered the sand to Holland. The Nuclear Regulatory Commission issued Englehard a license to cover the transfer activities. Historical records indicate that Tank 905 was "decontaminated" and painted in September 1974.

It was obvious from AEI's investigation that the 1974 transfer activities had resulted in substantial material spillage around the former storage tank. We coordinated an acceptable remedial goal (5 pCi/g Th-232 in soil) with the NRC and the Illinois

Department of Nuclear Safety (IDNS). We contracted with AEI in 1999 to remediate the site. AEI finished the effort and shipped the remediation waste to Waste Control Specialists (WCS) during the summer of 2000. AEI shipped 26,000 ft3 (2,487,350 lbs) to WCS for disposal. It's noteworthy that we had to dig up more than ten-times the original material storage volume to meet the acceptable remediation goal!

The NRC and IDNS conducted confirmatory surveys in the fall of 2000. The agencies have yet to issue formal written acceptance of our release, but all indications are that the site has

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www.epa.gov/radiation/marssim/. The site also includes a complete list of comments and resolutions. The update mainly provides clarification and editorial corrections.

Other recent updates include revisions to the D and D and ResRad software codes. You can download the latest version from the Nuclear Regulatory Commission website at http://www.nrc.gov/RES/rescodes.htm

If you have any questions on this subject, you can contact Mr. David Horton at (309) 782-1759, DSN 793-1759, or HortonD@osc.army.mil.

VISIT OUR WEB SITE AT:

http://www.osc.army.mil/dm/DMWWEB/indexdmw.htm

AND DOWNLOAD A COPY OF THE NEW DOD 4715.6-R, THE NEW DOD LOW-LEVE RADIOACTIVE WASTE PROGRAM REGULATION

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